PERIODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.

NOV 21 1933

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

NOVEMBER 18, 1933

"Rosetta Stone" of Prehistoric America

See Page 328

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL XXIV No. 658

The Weekly Summary of Current Science

Published by

SCIENCE SERVICE

The Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by WATSON DAVIS

Subscription rates—$5.00 a year postpaid; two years $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give your old address as well as the new one in notification to Circulation Department, SCIENCE NEWS LETTER, 21st and Constitution Ave., Washington, D. C., at least two weeks before change is to become effective.

Advertising rates furnished on application.

Board of Trustees of Science Service

Honorary President, William E. Ritter, University of California. Representing the American Association for the Advancement of Science, J. McKeen Cattell, *President*, Editor, Science, Garrison, N. Y.; Burton E. Livingston, Johns Hopkins University, Baltimore, Md.; Raymond Pearl, Director, Institute for Biological Research, Johns Hopkins University, Baltimore, Md. Representing the National Academy of Sciences, W. H. Howell, *Vice-President and Chairman of Executive Committee*, Johns Hopkins University, Baltimore, Md.; R. A. Millikan, Director, Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena, Calif.; David White, Senior Geologist, U. S. Geological Survey. Representing National Research Council, Vernon Kellogg, Secretary Emeritus, National Research Council, Washington, D. C.; C. G. Abbot, Secretary, Smithsonian Institution, Washington, D. C.; Harrison E. Howe, Editor of Industrial and Engineering Chemistry. Representing Journalistic Profession, John H. Finley, Associate Editor, New York Times; Mark Sullivan, Writer, Washington, D. C.; Marlen E. Pew, Editor of Editor and Publisher, New York City. Representing E. W. Scripps Estate, Harry L. Smithton, *Treasurer*, Cincinnati, Ohio; Robert P. Scripps, Scripps-Howard Newspapers, West Chester, Ohio; Thomas L. Sidlo, Cleveland, Ohio.

Staff of Science Service

Director, Watson Davis; Staff writers: Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, J. W. Young; Librarian, Minna Gill; Sales and Advertising Manager, Hallie Jenkins.

Copyright, 1933, by Science Service, Inc. Republication of any portion of the SCIENCE NEWS LETTER is strictly prohibited since it is distributed for personal, school, club or library use only. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service, details and samples of which will gladly be sent on request.

Members of the American Association for the Advancement of Science have the privilege of subscribing to the SCIENCE NEWS LETTER at the reduced price of $3 per year. Application for this privilege should be accompanied by privilege card obtained from the Permanent Secretary, A. A. A. S., Smithsonian Institution Building, Washington, D. C.

Publication Office, 1930 Clifton Ave., Baltimore, Md., Editorial and Executive Office, Constitution Ave. at 21st St., N. W., Washington, D. C.

Address all communications to Washington, D. C. Cable address: Scienserve, Washington.

Entered as second class matter October 1, 1926, at the post-office at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. and Canadian Patent Offices.

DO YOU KNOW?

The city of Samarra on the Tigris River was built, enlarged, and abandoned within 47 years in the ninth century A.D.

Nobel's invention of dynamite cheapened iron, lead, copper and zinc so that industry began to use them to new advantage.

The average blood pressure of the inhabitants of Guatemala is found to be notably lower than that of North Americans.

Sugar is sugar to most people, but a journal of the food industries points out that there are 15 grades of brown sugar alone.

When the Spaniards were exploring the southern United States, they sometimes traded coats of mail to appreciative Indians who called these "iron shirts."

The world's fastest passenger elevators have been installed in Rockefeller Center, New York City, one car being approved to operate at 1,400 feet per minute.

One of the newest electric toasters is provided with windows on the sides, so that the toasting process may be conveniently watched.

Inscriptions carved on the walls of Egypt's temples were often subjected to official censorship before completion, says an Egyptologist.

The largest rodents that exist today are capybaras, which are "giant guinea pigs" that sometimes grow to weigh over a hundred pounds.

A football player may lose as much as seven to ten pounds during a game, but a man in good condition usually regains his weight within a day.

Tensile strength of airplane rivets is doubled by rushing them from a 950-degree heat treating bath to the cold of 100 degrees below zero afforded by dry ice containers.

The electric eye can be used to safeguard workers around some dangerous machinery, by cutting off the power and applying brakes when any one enters the danger zone.

WITH THE SCIENCES THIS WEEK

AGRONOMY

What shall we grow in the Boulder Dam area? p. 327. *Plants Useful to Man—W. W. Robbins and Francis Ramaley—Blakiston*, 1933, $3.

ARCHAEOLOGY

What is obsidian? p. 328.

What style of shoes were worn in Texas about 1000 years before Columbus? p. 333.

ASTRONOMY

What new metals can be used on telescope mirrors? p. 335.

AVIATION

Can an airplane be landed safely if the pilot cannot see the ground? p. 330.

BOTANY

Where do stalked puffballs grow? p. 326. *The Gasteromycetes of the Eastern United States and Canada—W. C. Coker and J. N. Couch—Univ. of N. Car. Press*, 1928, $12.

CHEMISTRY

How long since the last international congress of chemists? p. 328.

EMBRYOLOGY

Are apes and men alike before they are born? p. 323.

ENTOMOLOGY

Are spiders insects? p. 333. *Field Book of Insects—Frank E. Lutz—Putnam*, 1921, $2.50.

GEOLOGY

What are tektites? p. 329.

ICHTHYOLOGY

How big do whale sharks grow? p. 325.

MEDICINE

Should a cardiac patient go South? p. 324.

METEOROLOGY

What is ball lightning? p. 323.

ORNITHOLOGY

Where has a red bob-white been produced? p. 326.

Will ostriches survive cold winters? p. 329.

PHARMACOLOGY

What is the only bichloride of mercury antidote? p. 328.

PHYSICS

How many particles are there in the universe? p. 325.

How old are the newest Nobelists? p. 323. *A Short History of Atomism, from Democritus to Bohr—Joshua C. Gregory—Black, London*, 1931, 10s 6d.

PSYCHIATRY

How does the voice reveal nervous diseases? p. 329.

PUBLIC HEALTH

What caused the outbreak of amebic dysentery in Chicago? p. 328.

These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but are references for further reading. Books cited can be supplied by Book Dept., Science News Letter, at publishers' prices, prepaid in the United States.

PHYSICS

Nobel Prizes Awarded To Leaders in Theoretical Physics

1932 Prize Goes to Heisenberg; Prize for 1933 Divided Between Dirac and Schroedinger

THREE European leaders in the new physics will receive the 1932 and 1933 Nobel prizes in physics, it was announced in Stockholm. Prof. Werner Heisenberg of Leipzig was awarded the 1932 Nobel prize in physics for his development of quantum mechanics and its resultant discovery of the allotropic forms of hydrogen. The 1933 Nobel physics prize is divided between Prof. E. Schroedinger of Berlin, now working at Oxford, and Prof. P. A. M. Dirac of Cambridge, England, for their new forms of atom theory.

The 1933 Nobel prize in chemistry will not be awarded this year, it was announced.

Three Youthful Europeans

These three relatively youthful European physicists are the creators of physical theory that has had great influence upon philosophical ideas as well as science.

Prof. Heisenberg is now only 32 years old. Still younger is Prof. Dirac who is 31 years old, while Prof. Schroedinger, formerly of Berlin and now of Oxford, who shares the 1933 physics Nobel award with Prof. Dirac, is the senior member of the group with an age of 46.

These three new Nobelists, two Germans and an Englishman with a French name, all have picturesque personalities and their erudite adventures in physics pursued in both European and American centers of research have been accompanied by happy companionship among the trio and with other researchers in physics.

Famous At Twenty-One

Prof. Heisenberg was the son of a professor of Greek philology. He studied with Prof. Arnold Sommerfeld and Prof. Niels Bohr. By the time he was 21 he was beginning to acquire an international reputation for his studies of atomic theory. His great achievement, the development of quantum mechanics, began in the fall of 1925. Then the young Heisenberg presented the scientific world with a new mathematical method adequate for describing how the electrons revolving about atomic hearts stick to their orbits.

The famous Heisenberg principle of indeterminance or uncertainty was a further development of his theory. This affirms that in picturing the physical world to ourselves we must consent to certain limitations; for instance, we should not try to imagine a flock of electrons all having nearly the same position and nearly the same velocity.

The citation of the Nobel award to Prof. Heisenberg states that it is for his development of quantum mechanics "and its resultant discovery of allotropic forms of hydrogen." One of Prof. Heisenberg's countrymen, then of the Kaiser Wilhelm Institute at Berlin, demonstrated ex- (*Turn to Page* 333)

EMBRYOLOGY

Unborn Gorilla Baby Offers Unique Study

A GORILLA baby that never lived because its mother was accidentally shot shortly before the baby's birth was due is affording a unique opportunity for study at the Western Reserve School of Medicine, Cleveland.

The gorilla fetus, to give it the scientific term for such unborn offspring, is the sixth known to scientists and in by far the best condition of all of them, according to Dr. W. M. Krogman, associate professor of anthropology, who will study it under the direction of Dr. T. Wingate Todd.

It was sent to Dr. Todd by a medical missionary, Dr. W. H. Lehman of Abong Mbong, French Cameroun, Africa. It is extremely valuable to scientists because the claim has always been made that there is an even closer resemblance between the fetuses of humans and apes than between adult humans and apes, Dr. Krogman explained.

Science News Letter, November 18, 1933

METEOROLOGY

Ball Lightning Apparently Connected With Dust

BALL LIGHTNING, one of the least understood of the electrical phenomena of the air, seems to be connected with the clouds of dust blown before a "line squall" wind or a tornado. Such at least has been the observation of Prof. J. C. Jensen of the physics department at Nebraska Wesleyan University as reported in *Physics*.

One ball lightning display observed by Prof. Jensen took place during an August thunderstorm while he was getting photographs and scientific records of ordinary lightning and the other phenomena accompanying it.

The cold air rushing ahead of the storm cloud was filled with a swirling mass of dust, he says. Brilliant lightning flashes were seen descending in rapid succession from the cloud to the earth. In the wake of one of these flashes there appeared a shapeless mass of lavender color which seemed to float slowly downwards. The mass seemed most brilliant near the ground, and gave the impression of a gigantic pyrotechnic display. Two or three glowing globular structures seemed to roll (*Turn Page*)

HEISENBERG SCHROEDINGER DIRAC

BALL LIGHTNING "LOOKS PLEASANT"

along a pair of high voltage power lines for a hundred feet or more, then bounced down on the ground and disappeared with a loud report.

Prof. Jensen's photographs showed these strange and weirdly beautiful objects plainly. Knowing the lens-angles of his cameras and the distance to the power line, he was able to calculate their size. One of them had a diameter of about 28 feet, and the other was some 42 feet across. These figures are much larger than those usually given for ball lightning.

A second ball-lightning display reported by Prof. Jensen was seen during a tornado in Iowa by George Raveling, a U. S. Weather Bureau observer. As he described it:

"From the sides of the boiling, dust-laden cloud a fiery stream poured out like water through a sieve, breaking into spheres of irregular shape as they descended. No streak lightning of the usual type was observed and no noise attended the fire-balls other than the usual roar of the storm."

Science News Letter, November 18, 1933

The Pan American Scientific Congress, which was to be held in Mexico City this month has been postponed until 1935.

A cave-city on the Crimean peninsula is to be scientifically explored by a Russian institution and the University of Pennsylvania Museum.

MEDICINE

Tropical Climate Benefits Heart and Rheumatic Diseases

Society For Tropical Medicine Also Hears That Southern Immigrants in North Succumb To Hardening of Arteries

A TROPICAL climate may be used in the conquest of some diseases. Weather of the north weakens southern immigrants to certain types of infection. These curious disease-climate relations were reported to the American Society for Tropical Medicine meeting in Richmond this week.

Patients suffering from inflammatory rheumatism and heart disease may be benefitted by a tropical climate, it appears from a discussion of the advantages of cure resorts in the tropics presented at the meeting by Drs. Louis Faugeres Bishop and Louis Faugeres Bishop, Jr., of New York City.

"We know that climate has a profound influence on the lives of those who enjoy its advantages, but one of the most striking facts in connection with climate is that it is not only the climate itself we look to for benefit, but equally important is change of climate at the right time," Dr. Bishop said.

He suggested that a tropical climate should be available for physicians to order for their patients and that eventually it may be possible to determine by experiment the climate best suited to each person.

The absence of inflammatory rheumatism in the tropics, testified to by many observers, prompted Dr. Bishop's interest in the health advantages of a tropical climate. He thinks it should be tested for young people with progressive rheumatic heart disease and for elderly people with disease of the heart of the degenerative type. Many of the drawbacks of the tropics can be mitigated with modern air conditioning.

"The climate of the tropics promotes all those things which are needed in heart disease," said Dr. Bishop. "It promotes distaste for physical exercise. It is a notable fact that many heart patients who go to the tropics to pass their remaining days find those days very much longer than anybody expected."

He advised that the health resort established in the tropics should be properly equipped with a medical personnel and technical facilities for the diagnosis and treatment of disease.

Southerners who migrate to the North are more susceptible than northerners to arteriosclerosis, familiarly known as hardening of the arteries, in the opinion of Dr. Clarence A. Mills of the University of Cincinnati.

Dr. Mills presented figures which he said proved this point. Calling arteriosclerosis the "greatest of our degenerative diseases," Dr. Mills said that "these southern migrants die at a much earlier age from this cause than do native northerners and also earlier than their fellowmen who remain in the South."

"The great influx of southerners, both white and colored, into the manufacturing cities of the North during the last fifteen years has presented us some important health problems quite aside from those of sanitation and personal hygiene," he stated.

"Not only are these migrants found more susceptible to acute respiratory diseases such as pneumonia, sinusitis and colds, but they also show frequent metabolic disturbances. Toxic goiter and diabetes seem to attack them even more than they do native northerners. Various types of asthenia (weakness) with nervous exhaustion are also particularly common among them."

Science News Letter, November 18, 1933

▼ RADIO ▲

TULAREMIA

an address by

Dr. Edward Francis

—of the National Institute of Health

Wednesday, November 22, at 4:35 p. m., Eastern Standard Time, over Stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

E. W. Gudger Photo

GREATEST OF SHARKS

Whale sharks swim all the warm seas. They are the greatest of all sharks, lengths of twenty to thirty feet being common, and at least one nearly forty feet long has been taken. Like all sharks, they have no real bones in their skeletons, only cartilage, so that when hauled out of water they "squash out" considerably, as did this huge specimen.

PHYSICS

Revived Ether Concept Sets Cosmic Explosion Speed Limit

SEEKING to link the extremely minute realms of the new quantum mechanics with the wide-flung scope of the mechanics of relativity, Sir Arthur Eddington, the Cambridge astronomer, presented to the famous Royal Society of London new mathematical equations which may receive acceptance by scientists and thus extend man's understanding of the physical world.

To obtain tractable equations in linking microscopic quantum mechanics and macroscopic relativity, Sir Arthur found it necessary to use something mathematically simpler than the kilogram as a comparison standard of mass. As an intermediary, therefore, he uses an ideal uniform distribution of matter, described as a sort of ether.

The link between quantum mechanics and relativity is given by a quadratic equation: $10m^2 - 136mm_0 + m_0^2 = 0$.

The letter m is the mass of the electric particle and the two roots of the equation give the masses of the fundamental units of matter, the proton and the electron, found to be in the ratio of 1847.6 to one. The letter m_0 is the mass of comparison of the ether and it is calculable from a formula in terms of the following four fundamental constants: Planck's constant, the velocity of light, the de Sitter radius of empty space time and the number of particles in the universe. This number is 10^{79}.

In the maze of connections between physical constants developed by Sir Arthur this number of particles in the universe is the one pure number which has as yet no theoretical explanation.

One result of the equation that can be tested by observational astronomy is that there is a limiting speed of recession of the nebulae or the so-called red shift or Doppler effect. This limit is computed by Sir Arthur as 780 kilometers per second per megaparsec. This is a sort of upper speed limit for the explosion or expansion of the universe.

Sir Arthur Eddington, widely known as the author of "The Nature of the Physical World" and other books as well as for his scientific work in astronomy and theoretical physics, has in the past few years been developing a theory of the electron that can be reconciled with the relativity theory of Einstein, which incidentally Sir Arthur by his 1919 eclipse expedition did much to bring to the attention of science. (*See SNL, Nov. 12, 1932, p. 303.*)

Science News Letter, November 18, 1933

DEMOGRAPHY

Nevada and Missouri Lead in Homicide Rates

NEVADA had the highest homicide rate among white people for the years 1929 to 1931, while Missouri led the list for homicides among colored people, a statistical study conducted by the Metropolitan Life Insurance Company shows.

Statisticians who made the study, which has just been reported, are unable to give any reason for the geographic distribution of homicide. The rate for white people is three times as high in the United States as in Canada and ten or eleven times as high as in England.

Lowest homicide rates, for both white and colored people, were found in the New England states, particularly Maine, Vermont and New Hampshire.

Above-average homicide rates are concentrated in certain areas of the country. For white people there are two regions of highest homicide rates, one in the Southeast and the other in the Mountain states, with Oklahoma forming a connecting link.

The homicide rate for colored people was below average in the Southern states. The high homicide rates for negroes were found in states around Indiana, namely Illinois, Michigan, Ohio, West Virginia, Kentucky and Tennessee. In Indiana, however, the rate was lower than in these surrounding states.

The statisticians pointed out in their report that homicide is mainly a problem of cities, rural areas showing uniformly lower rates.

Science News Letter, November 18, 1933

ECOLOGY

Conifers Grow During Winter, Structures Show

EVIDENCE that the great evergreen trees of the Pacific Northwest grow all winter long has been found in microscopic details of their internal structure by Prof. Ansel F. Hemenway of the University of Arizona. The cambium, or growth layer just beneath the bark, appears to be in an active condition from early autumn until the summer drought sets in, as do also the sieve tubes, elongated cells whose function is considered by botanists to be the transportation of dissolved food substances.

Similar structures from the trunks of deciduous or broad-leaved trees of the

same region, as well as from trunks of both conifers and broad-leaved trees in Kentucky, appear to be in a "closed-down" condition in specimens collected during the winter months. The Oregon broad-leaved trees also seemed to have a period of little or no growth enforced upon them by the midsummer drought of the region.

Thus condemned to inactivity during two long periods in each year, while their evergreen competitors are able to grow continuously throughout nine or ten months of mild, moist autumn, winter and spring, the broad-leaved trees have lost the race for supremacy in the Northwest Coast region and the forest there has come to consist almost entirely of such conifers as Douglas spruce, grand fir, coast cedar and yellow pine.

Prof. Hemenway has communicated a brief preliminary report of his investigation to *Science*, with the statement that a complete detailed account will be published shortly.

Science News Letter, November 18, 1933

ENTOMOLOGY

Bee Uses 22 Muscles When She Stings You

WHEN A BEE stings you, she uses 22 muscles to carry through three distinct movements of her weapon. So says R. E. Snodgrass of the U. S. Bureau of Entomology, in a report on the morphology of the insect abdomen which has just been issued by the Smithsonian Institution. The first movement thrusts the sting out, the second swings it downward, and the third works the little lancets that bury the sting in the victim's flesh.

The sting of a bee or wasp, Mr. Snodgrass states, is a modified ovipositor or egg-laying organ, and the poison-sac that supplies it with its peculiarly painful ammunition is one of the accessory sex glands. The idea that a bee "feels around" for a favorable place to thrust home its dagger is a fable, he continues. Stinging is largely an automatic art. When a bee "sits down" on her victim, "the highly mobile abdomen swings around in all directions and the decurved tip strikes at random until an object is encountered which, if nothing else presents, may be the body, head, or mouth of the bee herself."

Science News Letter, November 18, 1933

Tasteless quinine is a recent product of the laboratory.

ORNITHOLOGY

American Ornithologists Celebrate Semi-Centennial

"Native Wood-Notes Wild" Caught With Sound Truck; 58,000 Birds Banded by Businessman-Naturalist

BIRD SONGS, recorded with motion pictures of the birds themselves, were demonstrated before the meeting of the American Ornithologists' Union in New York by a hunting team consisting of two scientists and one financier: Prof. A. A. Allen of Cornell University, Albert R. Brand, New York banker, and P. P. Kellogg, Cornell graduate student.

Most ornithologists, even professional ones, are satisfied if they can get close enough to a bird and its nest to get a good photograph, either movie or still, but Mr. Brand has succeeded in stalking his shy quarry with the whole ponderous heavy artillery of a sound-recording truck.

Mr. Brand went about the business of hunting songs with a sound truck in a most business-like way. Having "graduated" from Wall Street, he enrolled as a student at Cornell University, and studied ornithology under Prof. Allen for a whole year. Then he made an alliance with him and Mr. Kellogg, and the three went a-hunting for bird songs.

Any one who has ever seen the elaborate precautious taken against extraneous sounds in a "talkie" studio, where a dropped leadpencil or a cough is almost a capital offense, will appreciate the difficulties faced by the song-hunting expedition in the field, where no amount of shushing can stop leaves from rustling, insects from shrieking close to the "mike," or lonesome cows from mooing.

Evolution in Tennessee

Tennessee, once the eruptive center of anti-evolutionary activity, is now the scene of one of the most interesting bits of contemporary evolution. For in that state there has been produced, by natural processes, a beautiful red variety of the native quail or bob-white. Dr. Herbert Friedman of the U. S. National Museum, told of the development of the new variety and of the good work of Tennessee naturalists and game authorities in encouraging and propagating it.

Fifty-eight thousand birds, each with a light metal band around one leg telling where it had been, have passed through the hands of W. I. Lyon of Waukegan, Ill. Mr. Lyon makes his living as a real estate dealer, and follows ornithology as a scholarly hobby. At the meeting of the Union, he reviewed his years of activity as a bird bander. His records show that he has taken part in tracing the migrations and other life activities of no less than 58,000 birds.

Science News Letter, November 18, 1933

BOTANY

Strange Puffball Has Stalk Ending in Foot

A PECULIAR fungous growth from the Colorado Desert is being studied by Elizabeth Eaton Morse, graduate student at the University of California. It looks like a tall puffball growing at the top of a woody stem with a much enlarged base.

At first sight, the finder might mistake the plant for the common shaggy-mane mushroom, *Coprinus comatus*. But if it is split along its length, one finds that the structure within is entirely different from that of any gill fungus. The scaliness of the outer coat contributes to the deception.

Miss Morse has received specimens from lands far removed, all from desert or sandy regions within forty degrees north and forty degrees south of the equator. Although widespread, occurring in north, west and south Africa, Madagascar, India, Hawaii, Brazil, Jamaica, the plant may be considered rare except in certain limited areas where conditions for growth are the most favorable.

After a careful comparison of all specimens with abundant Colorado Desert collections, Miss Morse is inclined to believe that there is really only one

PUFFBALL WITH A FOOT

exceedingly variable species, *Podaxis pistillaris*. This name refers to the enlarged "foot," to the fact that the stem extends through the head to the summit, and that the plant is club-shaped.

This fungus has been described under eight different genus names and twenty-five species names, due, doubtless, to great variations in size, color, and to different external and internal aspects at different stages of development.

Science News Letter, November 18, 1933

A railroad in Minnesota is planting willows, conifers, and other trees to serve as snow catches along its right of way.

The University of Wisconsin has a new "chair of game management" to promote the raising of game birds and game animals as part of regular farming operations.

AGRONOMY

Agricultural Scientists Seek New Crops For the Desert

Products That Will Not Compete With Those of Older Farm Lands to be Grown in Boulder Canyon Region

WHAT CROPS shall be grown on the new million acres of land in Arizona and California that will be brought under irrigation by the Boulder Canyon Dam now being built? What can be planted that will not add to the already terrific problem of agricultural over-production?

These are the questions that have been put to research scientists in the U. S. Department of Agriculture. The hunt for non-competitive crops for America's coming New Egypt is on.

The problem can be solved, the scientists are confident, because of the unique character of the climate of the prospective new farming area. The great bulk of American farm lands are in regions of humid climate, depending on rainfall for their water supply, and not having the hot sun and dry desert air of the Southwest. Their crop possibilities are already well realized, and while the Southwest irrigated country can compete with some of them, the moist-climate areas cannot compete with the irrigated Southwest in producing the crops to which that region is best adapted.

An irrigated land with hot sun and dry air must look to such countries as Egypt and Mesopotamia, the first homes of farming, for agricultural suggestions. And this is just what the Department of Agriculture scientists are doing.

Home-Grown Sewing Thread

One of the staple crops of the Boulder Dam area will probably be Egyptian cotton, especially the American-bred Pima variety of Egyptian cotton, and a new Pima-Sakel hybrid suitable for making sewing thread. These cottons are not competitors with the varieties grown from Texas to Georgia. They are special, long-fibered cottons, used mainly for tire fabric, sewing thread, fine lisle hoisery, and certain other special kinds of clothing. The American market absorbs all the Egyptian-type cotton that can be grown in the Southwest at present, and sends to Egypt for thousands of bales more. It is expected that much of this present import requirement can be met by extending Egyptian cotton culture into the new irrigated lands as they come available.

Another possibility of the area is dates. The American consumption of dates at present is only half a pound a year per capita. Canadians eat twice as many and Englishmen three times as many. If the American demand can be raised merely to the Canadian level, that would mean a market for 120,000,000 pounds of dates a year. Supposing that half of that requirement will still be met by dates imported from the Near East, as at present, the new domestic market could take care of all the dates raised on 10,000 acres of land, at the yield rate of American date orchards at present in bearing.

From the Land of the Califs

Another fruit now imported largely from the land of the Califs is the Smyrna-type fig. This is also a possibility for the Boulder Dam area, for it requires the oasis climate provided by irrigation under a hot sun.

These three crops are well-tested possibilities for Southwestern irrigated agriculture. They are not competitors with agriculture elsewhere in the United States, and it is probable that they will take some years of development before they can make a serious bid to replace all imports in their respective fields.

Before any of these can be recommended to settlers on the new lands, they must be tested out in the region, their possibilities realized, and adaptations made to overcome difficulties of cultivation and handling. For this reason it seems desirable that the Department of Agriculture scientists should go now into this unirrigated desert region, make limited test plantings irrigated with water from deep wells, and arrange a planned agriculture for the country in advance of its settlement.

Science News Letter, November 18, 1933

PUBLIC HEALTH

Dysentery Expected From Chicago Outbreak

PHYSICIANS throughout the country are warned to be on the lookout for cases of amebic dysentery among their patients who visited Chicago this summer and fall. This warning was sent at the suggestion of Dr. R. R. Spencer of the U. S. Public Health Service who is assisting Chicago's health Commissioner, Dr. Herman N. Bundesen, in an investigation of the dysentery outbreak in that city.

Some of the cases were not recognized as dysentery and the patients have been operated on for appendicitis and ulcerative colitis with unfortunate results, Dr. Bundesen has found. This is because the disease for the most part only occurs in tropical countries and is generally not thought of by physicians practicing in the north.

The outbreak, which started early in July, has been traced to chronic cases and carriers of the disease among the food handlers in two Chicago hotels.

Amebic dysentery is caused by a parasitic single-celled animal. It may be spread by contaminated water or foods that are eaten raw or by carriers who handle food, as in the Chicago outbreak. Cooking kills the ameba. The disease takes about three weeks to develop after infection.

Science News Letter, November 18, 1933

ARCHAEOLOGY

Obsidian Artifact With Mammoth Bones in Nevada

"HIGHLY suggestive if not absolutely conclusive evidence" has been discovered that man roamed the region of Nevada as a living contemporary with ancient camels, little wild horses, huge mammoths and other animals that have long since departed from the American scene. The discovery is reported by Dr. George Gaylord Simpson of the American Museum of Natural History.

The object pointing to existence of man in such early times in America, is a small flake of dark volcanic glass, known as obsidian. It bears marks of chipping, such as a primitive man would make on material chosen for a blade. Nowhere in the region has obsidian been found, except for this piece. This fact strengthens the view that human hands transported the bit of volcanic glass to the place where it was dropped and where it became buried in what is now an "ancient stratum."

The obsidian flake was found when a field party, led by Fenley Hunter, was quarrying out bones of fossil animals. The important object was cut away from its resting place with a block of the undisturbed matrix still left around it, and the entire block was transported to the Museum, where the obsidian flake was removed and examined in the presence of several scientific observers.

Charcoal was found in three well-defined areas by the expedition, and is considered further evidence of human presence. The charcoal is thought to be remains of camp fires.

The animal bones immediately associated with the charcoal and the obsidian flake were remains of camel, bison, horses and deer. These were American animals of the Pleistocene or earliest post-Pleistocene geologic time.

That the discovery adds important evidence to the accumulating data pointing to early habitation of the New World by man, is Dr. Simpson's view.

Science News Letter, November 18, 1933

CHEMISTRY

Chemists To Meet In World Congresses

CHEMISTS of many lands are to meet next spring in the first World Chemical Congresses to be held since the World War. The first of the two meetings, the Third Chemical and Technical International Congress of Agricultural Industries, will meet in Paris beginning March 26, and the second, the Ninth International Congress of Pure and Applied Chemistry, will open its sessions in Madrid on April 5. These meetings will mark the fortieth anniversary of the first international congress of chemistry ever held, which was organized in Paris in 1894. The last preceding world chemical congress was held in Washington in 1912.

Plans for the double Chemical Congress were described before the meeting in Washington of the Association of Official Agricultural Chemists by Dr. Atherton Seidell, who recently returned from France.

Although the first of the meetings will be restricted to agricultural chemistry, the field is so vast that 21 sections have been organized and a long series of questions to be discussed in symposia have been selected.

Science News Letter, November 18, 1933

IN SCIE

PHARMACOLOGY

Antidote Found For Bichloride of Mercury

AN ANTIDOTE for poisonous bichloride of mercury (corrosive sublimate) has been discovered by Dr. S. M. Rosenthal of the U. S. National Institute of Health, Washington. It has already been used successfully to treat a victim of bichloride of mercury poisoning. The patient is now recovering in a hospital in Washington.

Cautious government scientists point out that the antidote is still in the experimental stage. However, results with animals poisoned by bichloride have been very good and the successful result with the first human case is considered very encouraging.

The new antidote, said to be the first known for bichloride of mercury, is formaldehyde sulfoxylate. It is given to the victim by mouth and injected into his veins simultaneously.

This type of poisoning is not very common, so that it may be some time before physicians have enough experience with it to determine its value. Dr. Rosenthal has asked hospitals to notify him of any cases of bichloride poisoning so that he may assist them in using the new antidote if they wish it.

Science News Letter, November 18, 1933

ARCHAEOLOGY

The Front Cover

Frank M. Setzler of the Smithsonian Institution is shown pointing to a little pottery bowl which he likens to the Rosetta Stone of the Nile because it is decorated with two kinds of art design, one known and the other unknown. Together with other discoveries made under Mr. Setzler's direction in mounds at Marksville, La., this bowl is expected to aid archaeologists in linking the shadowy Mound Builders with Indians of recent times. Mr. Setzler is leaning on a reproduction of the Rosetta Stone which enabled Egyptologists to read the hieroglyphics of Egypt. A complete report of this discovery was given in last week's SCIENCE NEWS LETTER.

Science News Letter, November 18, 1933

EE FIELDS

ORNITHOLOGY

Moscow Zoo To Breed Ostriches For Meat

HAVING discovered that ostrich meat has a delicious flavor, the Moscow Zoological Park has begun breeding ostriches on a large scale by means of incubators and also by a method that is described as forced mating, yielding from every pair about 15 or 16 chicks a year. When fully grown the birds weigh between 100 and 135 pounds.

It is planned to breed large numbers of ostriches in the southern steppes of the U. S. S. R. Thanks to its thick layer of fat, which originally served as a protection from the semi-tropical sun, the ostrich can endure the cold winter, even at the latitude of Moscow.

In its new home the ostrich still holds to its native calendar and begins to lay eggs in the fall, which corresponds to the spring of the Southern Hemisphere.

Science News Letter, November 18, 1933

PSYCHIATRY

Talkie Films Help Diagnosis of Disease

ANALYSIS of the tracks of the human voice upon sound films is said to give a clue towards the identification of the disease of the nervous system known as disseminated sclerosis, according to work carried out at the West End Hospital for Nervous Diseases, London. Writing in *Nature*, Miss F. Janvrin explains how this is done.

The vowel "ah" in a normal voice appears on the sound films as a series of spiky protuberances, in groups, each of which begins with a sharp upward jerk.

"The upward jerk is the result of a jet of air from the glottis. The distance from one upward jerk to the next gives the period of the laryngeal action. This period changes slowly and never suddenly. This means that the muscles controlling the tension for laryngeal action are well coordinated."

In patients suffering from the condition called ataxia the upward jerks follow one another at irregular intervals. The first one stands alone, far in advance of the others. The intervals for the following ones vary from long to short. This indicates that the muscles governing action of the larynx or voice box were shaky in their coordination.

There are several diseases that can produce this state of irregularity of speech, disseminated sclerosis being one of them, according to Miss Janvrin. By means of the sound film the abnormality that leads to identification of the latter condition can be observed even when it is too slight to be detected by the unaided ear.

One of the drawbacks at present is that the patient must be taken to a film studio for the registration of the voice, but it would be quite feasible to arrange for recording over the telephone from the hospital to the studio.

Science News Letter, November 18, 1933

GEOLOGY

Glassy Stones May Be From Shattered Planets

TEKTITES, peculiar glassy stones usually of a bottle-green color, found in various parts of the world, are probably fragments of some shattered planet, like the better known meteorites, in the opinion of Dr. V. S. Dubey of Benares Hindu University, India. Scientists have disagreed as to the origin of these curious stones, some maintaining that they were formed by the action of lightning and others that they were due to meteorites causing the rocks which they hit to melt and take on a glassy appearance.

Dr. Dubey, in a communication to *Nature*, shows that the amount of radium present in tektites found in widely separated parts of the world is very nearly constant (about one ten-trillionth) and that they could not have derived this radium from ordinary meteorites, which do not contain as much radium.

"This strongly suggests," writes Dr. Dubey, "that these tektites are derived from some mass which agrees in chemical composition as well as in radio-activity with the granitic layer of the earth."

Meteorites, which are definitely known to have fallen on the earth from outer space, consist either of a mixture of iron and nickel, or of stony material which, unlike that of the tektites, is basic, that is, it contains less silica.

Science News Letter, November 18, 1933

GEOLOGY

Vanished Continent Seen As Source of Northern Rocks

WASHINGS of sand and silt from a vast northern continent, completely vanished for more than half a billion years, form large parts of the mountains of Sweden and Scotland, as well as parts of present-day North America, in the opinion of Prof. Albert Gilligan, noted British geologist. Prof. Gilligan's discussion of the subject appears in the annual report of the Smithsonian Institution.

Some of the most ancient rocks of the lands around the northern end of the earth, Prof. Gilligan notes, are sedimentary in origin; that is, they were originally sands and muds, washed down from a higher land somewhere by great rivers and deposited on the sea bottom, as the Mississippi delta is being formed today. Subsequently they hardened into stone, and later still were lifted into plateaus and mountains. The great thickness and extent of these ancient sedimentary rocks in the chain of northern lands has convinced Prof. Gilligan that a land mass of major continental size, drained by rivers of many times the silt-carrying power of the present Mississippi, must have existed around the North Pole in remotely past time.

Science News Letter, November 18, 1933

PHARMACOLOGY

New Drug Relieves Colicky Pains

A NEW DRUG that is said to be useful in relieving spasms and colicky pains in the abdomen was described by Dr. David I. Macht of Baltimore at the Richmond meeting of the southern branch of the Society for Experimental Medicine and Biology.

The name of the new drug is monobrom-hydroxy-benzyl alcohol, or bromsalizol for short. Besides its soothing effect which makes it useful in relieving colicky pains, it can be used as a local anesthetic and is said to be "less poisonous than most of other local anesthetics in use."

The studies leading to development of this drug are the result of discoveries of Dr. Macht fifteen years ago of peculiar properties of certain benzyl esters and benzyl alcohol.

Science News Letter, November 18, 1933

AVIATION

Fog Loses Its Perils

New Blind Flying Equipment Robs Fog of Its Dangers And Yields Air Schedules Almost Independent of Weather

By J. H. WILLIAMS

TWO LITTLE pointers kept crossed over one tiny spot on an airplane instrument board make possible "happy landings" that are directed by radio when the unseeing pilot and plane are plowing through darkness and fog.

Radio and science have solved the problem of blind landings. Soon the mail will go through regardless of the weather, no matter how low the ceiling.

This latest development in radio aids to aeronautic navigation has completed the chain of devices that now make blind flying practical. With eyes flashing over this little dial and pointers the pilot can swoop down out of fog and complete darkness with mathematical precision until the wheels of his airplane scrape the solid earth of the airport's runway.

Many of our present pilots can remember all too clearly the days when the only thing that helped a pilot fly from one primitive field to another was his own ingenuity and resourcefulness. Night flying was then a gamble with death. With the advent of the air mail and the establishment of regular routes the airways began to be lighted. Powerful electric lights were set up at intervals along the way and the landing fields were equipped with flood lights. Night flying with perfect weather and visibility became possible.

But the weather man was not always kind enough and air traffic suffered from lack of regularity in schedules. This is where radio stepped into the aviation field for the first time. Along with the lights radio beacons were set up at intervals. Simple receiving sets in the airplanes picked up these signals that gave the pilot a point to point method of establishing his position. This allowed him to get through short distances of bad weather as long as he could still see his general landmarks and runways.

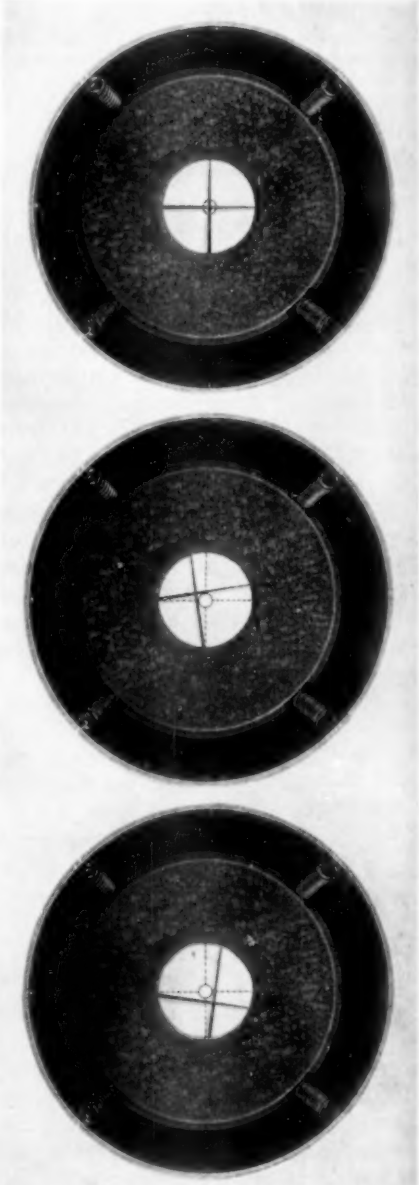
Scientists at the Bureau of Standards next concentrated on better methods of guiding the pilot so that the possibility of becoming lost would be very small. A radio device for direction finding was developed that allowed the pilot either to see or to hear his way along an approximately straight line between two airports. Directional waves broadcast from airports are now picked up in modern airplanes on two vibrating reeds. When the vibrating lines are equal in length the airplane is on its course, a deviation from the true course increasing the deflection of one reed and decreasing the other. Distance indicators actuated by radio waves tell the pilot the distance from various stations.

Within the last year the Bureau of Standards has developed a new transmission-line antenna, called the TL antenna, which sends out highly accurate directional guiding radio waves. Waves from the older loop antennas were subject to a variable rotational effect, particularly at night, due to the action of the ionized layers of the upper atmosphere on the horizontal components of the broadcast wave. The TL system eliminates the horizontally polarized components of the radio wave by eliminating radiation from horizontal elements of the antenna.

Must See Ground

Thus the airways were clear for night flying as long as the runways at the airports were visible. Taking off in absolute darkness was a stunt that a pilot would do if necessary, but landing without seeing the ground was considered an impossibility. This was the stumbling block that halted scheduled flying. Many schemes were proposed that were based on the idea that a meter which would show the height of the plane with great accuracy would allow the pilot to slowly sink to a "pancake" landing after he had been guided to the edge of the field by the directional beacons. The General Electric Company endeavored to put the familiar echo to work. This instrument shot a sound wave down to the ground from the plane and measured the time taken for it to be reflected back. This gave a measure of the altitude. As the plane neared the ground the interval of time between the emission of the sound and the catching of the echo became shorter and shorter, until they combined suddenly into one short note. At that instant the pilot pulled back on the stick and pancaked to the ground.

But this scheme had obvious disadvantages such as lack of directional guidance. Something had to come to



INVISIBLE PATH

Instead of watching the ground as he glides down to the field, the pilot keeps his eyes on this little instrument which is shown above representing three positions of an airplane. The top indication is that the plane is over the runway and on the proper path. The middle indication is that the plane is to the left of the runway and above the path while the position below shows the plane to the right of the runway and below the path.

be added to the range beacons, artificial horizons and other instruments that had made level and accurate directional flying possible under conditions of no visibility.

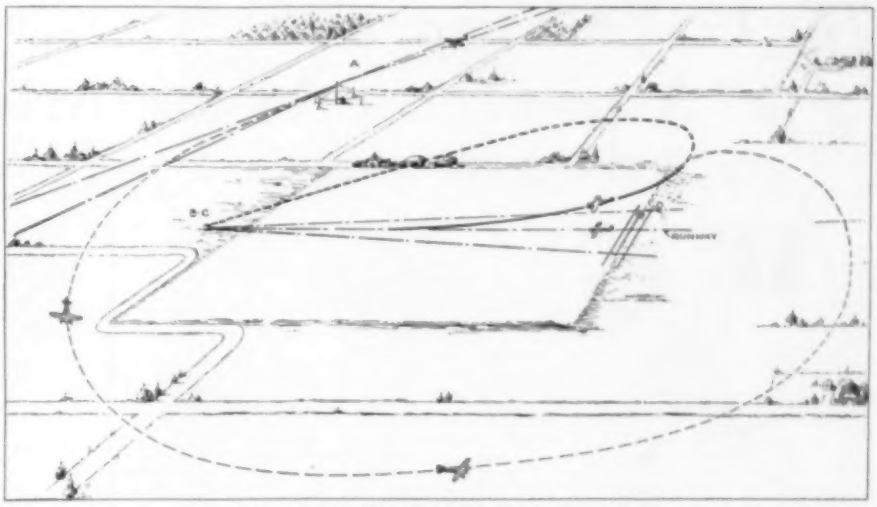
Ever since 1928 scientists from the Bureau of Standards have been working at College Park, Maryland, to solve this problem of finding a simple and effective radio system that would insure foolproof landings under conditions of no visibility.

The new radio apparatus developed by this group of scientists weighs only 15 pounds and was installed and tested at the Newark, N. J., Municipal Airport this year. The system depends upon three elements in order to inform the pilot of his position in three dimensions: height above the ground, direction to right and left, and distance from the runway. These elements are provided by the runway localizing beacon, marker beacons and the landing beams.

The runway localizing beacon informs the pilot of his directional position with respect to the airport and guides the plane over the runway. The low power sending apparatus for this beacon, which is similar to the large inter-airport directional beacons, transmits two radio waves to the pilot from two small directional antennas. These radio waves carry two different sounds or frequencies spreading out from the transmitter like a figure 8. In the top and bottom circles of the 8 a 65 cycle note is broadcast and in the quadrants not occupied by the circles an 87 cycle note is preponderant. There are thus four lines spreading out from the center of the figure along which the two different kinds of signals are equally strong. An instrument on the pilot's instrument board shows him whether the plane is proceeding along a line of equal signal strength. The volume of the signal is automatically controlled so that the pilot does not have to tune or control the instrument in any way.

This directional indicator is the vertical pointer on the small dial that is the key instrument for all blind landing. The pilot simply guides his plane either to the left or right until this pointer stands straight up. Then he is directed along one of those four lines that stick out from the imaginary figure eight. That line is the line of the runway.

The marker beacons tell the pilot how far he is away from the runway. A meter on the instrument board reads this directly up to distances as great as five miles. The needle of this instrument moves across a scale because the receiving set picks up more and more energy as the plane draws closer to the field. As a final step in this distance indication scheme two signals are sent out to the pilot by two marker beacons. The pilot hears the first of these through his headphones when he is 2000 feet from the edge of the airport and the second when he crosses the boundary. Thus the marker beacons tell him how far he has to go before landing.



COMING HOME BLIND

After being guided to the field by the radio range beacon A, the pilot circles the field and then glides down the path marked out in space by the runway beacon B and vertically by the landing beam C.

Follow Two Beams

The radio landing beam is the most important part of the scheme because it keeps the plane on a mathematical curve in a vertical plane which tapers to a perfect three-point landing on the runway. The radio wave from the sending station located at the far end of the field spreads out from that point over a horizontal section shaped like a piece of pie. This high-frequency beam is tilted up from the earth's surface at an angle of 80 degrees. The airplane receiving set picks up this energy and influences the horizontal needle of the master instrument. Airplanes do not fly directly down the beam, but follow a curved path underneath it. This curvature of the plane's path diminishes as the plane approaches the ground so that the path of flight is the line along which the receiver picks up a constantly intense signal from the sending station. There is a balance between the loss of intensity in gliding below the beam and the increase in intensity in approaching the transmitter.

The pilot does not have to tune his set or adjust the volume in any way. He simply keeps that horizontal needle pointing directly across the face of the master instrument and glides down to a perfect landing.

This system has been checked by over a hundred landings where the pilot was completely blinded by a hood pulled over the top of the cockpit. The check pilot in the front cockpit would take control only in case of an emergency. At College Park the system has passed the acid test, for here the runway is only 2000 feet long and 100 feet wide. The runway beacon adjustment was so perfect that a lateral deviation of the airplane from its course when 5 miles away of only 200 feet could be detected and at 4,000 feet 20 feet was discernible. At College Park it is necessary to clear a chimney by only 8 feet to make a proper landing. But a blinded pilot can do it and has done it more than 100 times.

A further test of the practicability of this method and of all the apparatus developed by the Bureau of Standards was a blind flight in a dense fog of a Department of Commerce airplane from College Park to Newark, a distance of 200 miles. James L. Kinney, the pilot, said that he did not see the field until several seconds after he had crossed the boundary, but was confident that he was about to make a perfect landing by using the instruments alone.

Colonel Charles A. Lindbergh, among other prominent pilots, has tested the apparatus by making two blind landings. He expressed (*Turn to Page* 335)

The 1933 Meeting of the

American Association for the Advancement of Science

BOSTON will be host city to the ninety-third meeting of the American Association for the Advancement of Science from Wednesday, December 27, 1933 to Tuesday, January 2, 1934, inclusive. While this is regarded as the fifth Boston meeting it is actually the sixth time that the Association has met in the Boston-Cambridge area, the second meeting having been held in Cambridge in 1849.

For the 1933 meeting, the official headquarters will be at the Hotel Statler, Boston, where the first general session, as well as a number of special events of importance, will be held. A large number of sections and affiliated societies will meet at this time.

The institutions welcoming the Association are: Harvard University, Massachusetts Institute of Technology, Simmons College, Boston University, Boston College, Northeastern University, Tufts College, Wellesley College and Weston College. Thus the colleges and universities in the whole metropolitan area will participate as hosts to the visiting scientists, although for general convenience the section sessions will be held in Cambridge, in the lecture rooms at Harvard, and at the Massachusetts Institute of Technology.

● REGISTRATION

The main registration headquarters will be at Memorial Hall, Harvard University, where registration facilities will be in operation from Wednesday morning, December 27, and maintained throughout the meeting. A subsidiary registration desk will be conducted in the main lobby of the central building of the Massachusetts Institute of Technology, especially for the benefit of members of the engineering and other sections, meetings of which will be held at the Institute.

● EXHIBITS

Extensive commercial, college and secondary school exhibits will be arranged at Memorial Hall, Harvard, in close proximity to the main meeting place of the various sections.

● GENERAL SESSIONS

The first General Session will be at the Hotel Statler on Wednesday evening, December 27, at which notable addresses of welcome and the address of Dr. John J. Abel, the retiring president, will be the principal features. This meeting will be followed by a reception. Other sessions of a general character will be the annual Sigma Xi Lecture at the Statler on Thursday evening and an open meeting under the auspices of Sections M and O, at which an address will be given by Secretary of Agriculture Wallace. Other sessions of special interest will be described in later announcements.

● SOCIAL EVENTS

The local committee is arranging a number of social events especially for the entertainment of visiting ladies, including visits to Museums, Wellesley, Radcliffe, etc. The officers of this committee are: A. Lawrence Lowell, Honorary Chairman; Karl T. Compton, Honorary Vice-Chairman; S. C. Prescott, Chairman; K. F. Mather, Vice-Chairman and A. L. Townsend, Secretary.

● ATTRACTIONS OF BOSTON

The Boston area is too well known to require extended description. Historically, educationally, and by virtue of its geographic position, it is familiar to many, perhaps to most, American scientists. Itself of great historic interest, its nearness to Plymouth, Salem, Lexington and Concord, and other places interwoven with early colonial life and patriotism make it a center of unusual significance to all Americans.

While Boston as a political unit is a city of approximately 800,000 people, the thirty cities and towns of the metropolitan area, all within a radius of fifteen miles, make the real or "greater" Boston the fourth city of the United States in population, with two and a quarter million people. Its commercial significance, based on the essential industries of wool, cotton, boots and shoes, paper, machinery, etc., is also well known.

Its beautiful park system, excellent harbor, ease of access to mountain, seaside, and charming rural districts need only be mentioned at this time. To those who will attend the Boston meeting this year under winter conditions its significance as an educational and scientific center will perhaps be the chief fact of importance, for Boston is the greatest educational center of the western world, including within its limits, or within a radius of 50 miles, not only the institutions which will act as hosts on this occasion, but numerous other colleges, schools of music and art, preparatory, and vocational schools. The attendants at these institutions would of themselves constitute a city of many tens of thousands.

Among the places of interest in Boston and Cambridge may be mentioned the Peabody Museum, Germanic Museum, Fogg Gallery, Astronomical Observatory and Botanic Gardens, at Harvard; the Nautical Museum at M.I.T.; the Boston Art Museum, Gardner Museum, Boston Public Library, Boston Natural History Society, State House (historic collections), Old State House, Watertown Arsenal, Navy Yard, Bunker Hill, Old South Church, Paul Revere House, etc. An illustrated booklet descriptive of Boston and its environs will be supplied to each registrant through the courtesy of the Boston Chamber of Commerce.

PROMINENT SPEAKERS

DR. JOHN J. ABEL
"Poisons and Diseases, and Some Experiments With the Toxin of *Bacillus tetani*" is the subject of an address to be given by Dr. Abel, of the Johns Hopkins University, Wednesday, Dec. 27 at 8:30 p. m.

DR. HENRY A. SIGERIST
—of the Johns Hopkins University will deliver an address on "The Foundation of Human Anatomy in the Renaissance," Dec. 28 at 8:30 p. m.

DR. W. M. DAVIS
Dr. Davis, Professor Emeritus of Harvard, will talk on "The Faith of Reverent Science," Dec. 28 at 4:30 p. m.

HON. HENRY A. WALLACE
"What Can Engineering Do For Agriculture"? is the subject of an address by the Secretary of Agriculture, Dec. 29 at 8:30.

DR. HENRY FAIRFIELD OSBORN
The Honorary Life President of the American Museum of Natural History will lecture on "Aristogenesis: the Creative Principle in the Origin of Species," Dec. 30, at 4:30.

OFFICERS OF THE ASSOCIATION

Henry Norris Russell - - - - - - - *President*
Burton E. Livingston - - - *General Secretary*
John L. Wirt - - - - - - - - - *Treasurer*
Henry B. Ward - - - - *Permanent Secretary*

EXECUTIVE COMMITTEE

J. McKeen Cattell
Karl T. Compton
David R. Curtiss
Philip Fox
Joel T. Hildebrand
Burton E. Livingston
Robert A. Millikan
Henry Norris Russell
Henry B. Ward
Edwin B. Wilson
A. F. Woods

Nat'l. Off., Smithsonian Inst. Bldg., Wash., D. C.

EXECUTIVE ASSISTANT, Sam Woodley
PRESS SERVICE, Austin H. Clark, *Director*
EXHIBITION, F. C. Brown, *Director*

OFFICERS OF SECTIONS

	Vice-President	*Secretary*
Mathematics (A)	Charles N. Moore	E. R. Hedrick
Physics (B)	C. J. Davisson	Henry A. Barton
Chemistry (C)	Arthur B. Lamb	J. H. Simons
Astronomy (D)	V. M. Slipher	H. T. Stetson
Geology and Geography (E)	R. T. Chamberlin	Kirtley F. Mather
Zoological Sciences (F)	A. S. Pearse	George R. LaRue
Botanical Sciences (G)	Karl M. Wiegand	Sam F. Trelease
Anthropology (H)	T. Wingate Todd	W. M. Krogman
Psychology (I)	Walter R. Miles	John E. Anderson
Social and Economic Sciences (K)	Wesley C. Mitchell	James Ford
Historical and Philological Sciences (L)	Waldo G. Leland	Joseph Mayer
Engineering (M)	C. F. Kettering	Vannevar Bush
Medical Sciences (N)	C. R. Stockard	W. M. Simpson
Agriculture (O)	A. R. Mann	P. E. Brown
Education (Q)	Walter F. Dearborn	William S. Gray

● Future meetings of the American Association for the Advancement of Science will be held in Berkeley, Calif., June 18 to 23, 1934; Pittsburgh, Dec. 27, 1934 to Jan. 3, 1935; Minneapolis, summer of 1935, and St. Louis, Dec. 27, 1935 to Jan. 2, 1936.

From Page 323

perimentally the two molecular arrangements of varieties of ordinary light weight hydrogen (atomic weight 1) which are known as parahydrogen and orthohydrogen.

To a large extent the work on atom theory for which the 1933 physics Nobel prize is divided between Profs. Schroedinger and Dirac is built upon the foundations of Heisenberg's work. The French physicist de Broglie, also a Nobelist, conceived the idea of the wave mechanics brand of physics which was utilized by Prof. Schroedinger who, by a different route, carried that idea much further.

Prof. Dirac was doing his graduate work at Cambridge when the great blaze of theoretical advance was set alight by Heisenberg's first paper of the autumn of 1925. Developing his own mathematics, using unconventional methods of remolding the mathematical methods of physics, as exemplified by his invention of "q numbers," Prof. Dirac produced a still more advanced system of quantum mechanics. Perhaps his most strikingly original and successful contribution is his relativistic theory of the electron. When just over 30 years of age Prof. Dirac was appointed to the highly prized Lucasian chair of mathematics at Cambridge.

Although until recently the Vienna-born Prof. Schroedinger held the chair of theoretical physics at the University of Berlin, to which he was appointed in 1927, he now finds work at Oxford more congenial than in the present atmosphere of Berlin. He made an enforced departure from Germany due to the present political regime and last month he was elected to fellowship in Magdalen College at Oxford.

Science News Letter, November 18, 1933

ARCHAEOLOGY

149 Old Shoes Found in One Prehistoric Apartment

A ROW of 149 old shoes would make an impressive sight, anywhere. When you find 149 old shoes worn in prehistoric times, and all collected from a single dwelling, that is something to stir the imagination. Who wore all those shoes, and when?

This exact number of worn-out sandals has been discovered by University of Texas archaeologists who explored the earthen floor of a prehistoric rock shelter apartment. The address of the apartment, which has long been unoccupied, is in Seminole Canyon, near the Texas border, in Val Verde County.

Trenching into the floor, through suffocating clouds of dust, the archaeologists brought up long-buried skeletons of some of the old inhabitants of the apartment, and various scraps and remnants of their clothes and useful possessions—including the large stock of their footwear.

Square toes were the style in this Texas canyon, a thousand years more or less before Columbus found America. Shoes were made sandal fashion, and were of fiber from the yucca plant. Many of the sandals still had tie strings in place when found.

As for the wearers, it is reported that most of them pretty well wore out their shoes. The sizes range from a child's five-inch foot to an Indian brave's ten-inch foot. The archaeologists found only a few obvious "rights" or "lefts."

The people who wore these shoes are so new to science that they have not yet received a name. Prof. J. E. Pearce and A. T. Jackson, who reported their exploration of the apartment in the canyon wall, consider this canyon a sort of melting pot for several kinds of early Indian culture. Here were blended ideas from the Basket Maker Indians in Arizona and other parts of the Southwest, ideas from the Big Bend region, and from Central Texas.

Besides the shoes, almost 5,000 articles in all stages of dilapidation have been recovered from the depths of the cave floor. The trash ranged from flint axes and hoes, wooden fire drills, and bone needles, to mussel shell spoons, baskets, a grass bed, and pieces of fiber string. From such fragments of household belongings, many time-worn almost beyond recognition, the life and the appearance of the ancient Texans begins to be understood.

Science News Letter, November 18, 1933

NATURE RAMBLINGS
by Frank Thone

ENTOMOLOGY

Insects, Bugs and Such

THE WORDS "insect" and "bug" are most persistently made to carry more than their legitimate loads of meaning.

Probably the widest understanding of these two terms is that insects and bugs are the same thing, and that any small creeping thing with a lot of legs is an insect or bug. Thus spiders, centipedes, ticks, and sometimes even worms and small crustaceans are lumped as insects. The bigger crustaceans—lobsters, crabs, shrimp and crayfish—we usually exclude from this classification, yet with a feeling that they are "something like insects," too—a sympathy with the Irishman of the anecdote who refused to eat a lobster, because it was "a boog."

It is too bad that this confusion should have arisen, for the words have clear-cut and exact meanings, and properly designate groups of creatures much smaller than their common use covers. An insect is, properly speaking, a small animal with an outside skeleton, six legs, one pair of antennae or "feelers" and four wings. The wing item is a little troublesome, for some insects have but one pair of wings and some none at all; but the basic insect pattern calls for four, and insects with fewer may be regarded as having lost them in the course of evolution. But the three pairs of legs and the one pair of antennae are sure marks of an insect.

All bugs are insects, but not all insects are bugs. In the strict sense of the term, a bug is an insect with a piercing bill folded back under its chest when not in use, and its outer pair of wings modified and usually somewhat shortened, so that the name of the group in the older classifications was Hemiptera, or "half-wing." Typical true bugs are

Which of Your Friends?

Which friends would value SCIENCE NEWS LETTER as a Christmas Gift?

WHY not use SCIENCE NEWS LETTER as a personally tested gift for good friends, men or women who you know have intellectual curiosity. If its thoroughness, accuracy and brevity have brought you satisfaction and enjoyment, these same qualities will be really useful to some whose names are on your Christmas list.

Send SCIENCE NEWS LETTER and then rest assured that you have given one of the most appropriate remembrances, not only because it will be received each week during the year, but also because of the special Christmas wrappings that are to enclose the first copy of your gift subscription.

Plans have been made for the first SCIENCE NEWS LETTER of your gift subscription to arrive with all the flurry and joy of Christmastide.

The first copy will greet your friends beautifully wrapped and enclosed in a crinkly paper, holly green Christmas box. Each box will be sent by Special Delivery mail to be delivered in the midst of the excitement of December 25.

Your gift box will also contain a silver and firecracker red Christmas card with your name inscribed upon it. (See the illustration here).

SCIENCE NEWS LETTER is an increasingly popular Christmas present among our subscribers. Last year, gift subscriptions increased 52 per cent. over the preceding year. SCIENCE NEWS LETTER is interesting, accurate and authoritative; and as a gift it will be delivered 52 times in the year instead of only once!

Special Christmas subscription prices are below:

This is the way the gift Science News Letter will be received—wrapped in a holly green, crinkly paper box carrying a card with your name on it. Delivery by special delivery mail.

Christmas Rates:

One subscription (1 year)	**$ 5.00**
One subscription (2 years)	**$ 7.00**
Two (1 year) subscriptions	**$ 7.00**
Three (1 year) subscriptions	**$10.00**
Additional (1 year) subscriptions	**$ 3.50 each**

In connection with a Gift Subscription, your own subscription may be renewed at the special Christmas rate of $3.50 a year.

To SCIENCE NEWS LETTER
21st and Constitution Avenue, N. W.,
Washington, D. C.

SEND SCIENCE NEWS LETTER for one year, as my gift, mailing the first copy boxed and with Greeting Card as above, to the following:

Name .....

Street Address .....

City and State .....

Name .....

Street Address .....

City and State .....

RENEW my own subscription for ☐ One year ☐ Two years

☐ I enclose $——— in payment of the above subscriptions.

☐ I will remit $——— on receipt of your bill on January 1.

MY NAME .....

Street Address .....

City ..... State .....

(19 118)

squash-bugs, box-elder bugs, giant water-bugs and the cicadas, often mistermed "locusts," that shrill interminably in the summer trees.

Spiders, centipedes, "thousand-leggers," scorpions, ticks and a number of other frequently rather disagreeable creeping things are lumped together in a rather miscellaneous class called arachnids. All of them differ from the insects in having more than six legs (spiders, with eight, have the fewest), and in not having a head distinct from the thorax or chest, as in insects.

There is one all-inclusive word for this whole array, insects, arachnids, crustacea, and all. It is "arthropods"—Greek for "jointed legs." But the word is itself many-jointed, somewhat harsh-sounding, and a bit professorial in appearance. So it has never found its way into common speech. So we continue to say "insect" or "bug" when we mean arthropod—to the sustained distress of entomological purists.

Science News Letter, November 18, 1933

MEDICINE

Thyroxine Replaced In Treatment of Gland

A NEW chemical preparation that can be used instead of thyroid extract for the treatment of one type of thyroid gland disorder is reported by Dr. A. B. Anderson of University College Hospital, Prof. C. H. Harington of London University and Prof. D. M. Lyon of Edinburgh University in *The Lancet*.

The new preparation has the scientific name 3-5-diiodothyronine. It has been used successfully in the treatment of myxedema, a condition due to underactivity of the thyroid gland characterized by dropsy-like swelling especially of the face and hands, dulling of mental activity, drying and wrinkling of the skin, falling hair and general sluggishness.

Daily doses of the new medicine relieve the symptoms of this disease without producing any ill effects. It is given by mouth and produces results comparable to injections of thyroxine, the thyroid gland preparation generally used to treat this condition.

Science News Letter, November 18, 1933

Snake charmers have no supernatural powers, says a zoologist; they simply understand the psychology of the poisonous snakes.

ASTRONOMY

Aluminum-Coated Mirrors New Aid to Astronomy

STARS THAT are hotter and brighter than science ever conceived, which make our own sun-star look like a candle beside a powerful beacon, have been "captured" in the aluminum mirrors of the Boothroyd expedition, just returned to Cornell University from a mountain peak in Arizona.

For the first time, the ultraviolet spectra of about 80 stars have been photographed, opening up an entire new field to astronomers in the study of stellar matter and stellar temperatures.

This feat was accomplished as the result of a new process developed by two young Cornell physicists, by which chrominum and aluminum can be deposited on glass. The silver-coated mirrors hitherto used in reflecting telescopes have been able to capture the spectrum only as far as the yellow-green region, and were unable to catch the high wavelength of the violet emnations, which tell more than anything else about the temperature and condition of the stars.

Prof. S. L. Boothroyd, head of the Cornell Astronomy Department, who organized the expedition to Arizona to put the new invention to practical test, reported on his return that not only did their spectrograms confirm previous ideas on the hotness of certain stars, but indicated that some of the so-called "dim" stars are in reality brighter, photographically, than those hitherto considered the brightest.

These tremendously hot stellar bodies are called "blue stars," as contrasted with red and yellow stars. They are dim, if not wholly invisible, to the human eye, because their ultraviolet rays escape the eyesight. The aluminum-coated mirror, however, proved much more effective than the human eye.

The Cornell scientists were given cooperation by the Lowell Observatory at Flagstaff, Ariz., and made use of the observatory's mountain station, 11,500 feet above sea level on Schultze Peak, some ten miles north of Flagstaff. This location was chosen because of the clearness of the atmosphere and the comparative absence of dust, which absorbs much of the ultraviolet spectrum at lower levels.

Science News Letter, November 18, 1933

Fog Loses Its Peril To Aviation

From Page 331

his satisfaction with the new aids to aeronautic navigation and said that it was the greatest single achievement in recent aviation history. With the research work being carried forward by the Bureau of Standards, engineers predict that airplane schedules will become increasingly regular and that bad weather will no longer be a reason for delay.

This group of workers has struggled with these problems and has put up a winning fight against Nature's perverseness. Leading them in this battle is Dr. J. H. Dellinger, chief of the radio section of the Bureau of Standards. His principal collaborators have been Harry Diamond and F. W. Dunmore, research scientists at the Bureau. James L. Kinney, the Department of Commerce pilot assigned to this development, succeeded Marshall H. Boggs who was killed in an accident while temporarily assigned to other duties on the West coast. Colonel Clarence M. Young, Assistant Secretary of Commerce for Aeronautics, was the government director of this work under the Hoover administration, and is succeeded by E. L. Mitchell, who will carry on the plans for its coming commercial use. Research will continue, on a lesser scale due to the economy cuts, under the direction of Major J. C. Cone, Assistant Director for Aeronautic Development of the Aeronautics Branch of the Department of Commerce, Dr. L. J. Briggs, Director of the Bureau of Standards, and Dr. Dellinger.

At present the blind landing apparatus is installed only at College Park and at Newark but engineers feel that it is only a matter of time before it will spread over the airways just as the earliest light beacons have done. Then the mail will go through regardless of weather.

Science News Letter, November 18, 1933

•First Glances at New Books

Psychology

NEW INTRODUCTORY LECTURES ON PSYCHO-ANALYSIS — Sigmund Freud—*Norton,* 257 p., $3. The history of Freud's Introductory Lectures, as given in the preface to this volume, is interesting. The first half of the first series were improvised and not written down until afterwards. For the latter half the process was reversed. They were composed during a summer vacation and were delivered later word for word. The second series have never been delivered except in the fancy of the author. He says: "My age has in the meantime relieved me of the duty of marking my membership of the University—even though the relation is only a peripheral one—by giving lectures; and a surgical operation has rendered me incapable of addressing an audience." Meanwhile, Freud's audience has expanded beyond the scope of any lecture hall, so it is well that he chooses this form in which to supplement his previous work after an interval of fifteen years of further study and contact with human problems.

Science News Letter, November 18, 1933

Archaeology

A PREHISTORIC ROCK SHELTER IN VAL VERDE COUNTY, TEXAS—J. E. Pearce and A. T. Jackson—*Univ. of Texas,* 143 p., 27 pl., free. The University of Texas has begun publication of a series of anthropological papers. This one deals fully with exploration of a rock shelter in the wall of Seminole Canyon, not far from the Mexican border. Burials and artifacts found there point to a culture with resemblances to the Basket Maker culture, that of the Big Bend region, and that of the central region of Texas. The tentative conclusion is that this canyon was an overlapping marginal area for several cultures.

Science News Letter, November 18, 1933

Botany

TEXAS GRASSES—W. A. Silveus—*Author, San Antonio,* xxxvii + 820 p., $5. Mr. Silveus makes his living as a business man, but the book he has produced is the book of a scientist in its thoroughness and completeness. Its usefulness will not be limited by the state boundaries of Texas, for that huge state comprises such a variety of habitats and climates, from desert to lush river bottom, from sea beach to prairie to mountain, that the 550 species described (with 420 full-page figures) represent a fair half of all the grasses in the United States. Field botanists and teachers in all four corners of the land will find the book useful; the more so since he has thoughtfully put in a number of features that will be especially helpful to the beginner or the amateur, such as a glossary, illustrative diagrams of botanical structures, etc.

Science News Letter, November 18, 1933

General Science

THE ROMANCE OF RESEARCH—L. V. Redman and A. V. H. Mory—*D. Appleton-Century,* 149 p., $1. The authors have produced an unusually interesting and satisfying exposition of the keyword of modern science and industry. Their story beings with "The Long Climb to Freedom of Thought," as indicated by chapter title, and carries through "The Business of Inventing New Materials." Appeal is made for research in the science of sociology in order that we may catch up with our material progress and reap the benefits of an unparalleled civilization. The book is one of a Century of Progress Series.

Science News Letter, November 18, 1933

Economics

OUR PRESENT DISCONTENTS—Collin Brooks—*Holt,* 333 p., $2.75. The author, who dedicates his book to the English distributist leader Hilaire Belloc, vigorously assails present large-unit economic systems, whether capitalist or state-controlled, and demands a refocussing of social attention on individual human, rather than mass material, values.

Science News Letter, November 18, 1933

Economics

STUDIES IN THE SOCIAL SCIENCES, 1933—*Rensselaer Polytechnic Institute,* 40 p. Students' theses selected for publication in this form because of the importance of the subject with which they deal. They bear on economics and business administration.

Science News Letter, November 18, 1933

Philosophy—General Science

GUIDE TO MODERN THOUGHT—C. E. M. Joad—*Stokes,* 268 p., $1.75. A British philosopher discusses the changes wrought in philosophical theory by the revolutionary discoveries of modern science. The author is head of the department of philosophy at the University of London.

Science News Letter, November 18, 1933

Ornithology

FIFTY YEARS' PROGRESS IN AMERICAN ORNITHOLOGY—Edited by F. M. Chapman and T. S. Palmer—*Amer. Ornithol. Union,* 225 p. The American Ornithologists' Union this year celebrates its fiftieth anniversary, this book being its *Festschrift.* It contains, in addition to the story of progress in the science of birds in this country, an excellent condensed review of the important literature, a chronology of the A. O. U. meetings, and special chapters on paleornithology, regionalism and other of the newest developments in this science. An excellent thing for the teacher of general zoology, as well as for the special student of ornithology.

Science News Letter, November 18, 1933

Paleobotany

A FOREST OF THE COAL AGE—B. E. Dahlgren—*Field Museum,* 39 p., 2 pl., 25c. A well-illustrated description of a three-dimensional restoration of a coal-bog of the Pennsylvanian period, recently placed on display in the Field Museum of Natural History in Chicago.

Science News Letter, November 18, 1933

Library Science

THE ORGANIZATION OF KNOWLEDGE IN LIBRARIES AND THE SUBJECT-APPROACH TO BOOKS—Henry Evelyn Bliss—*Wilson,* xvi, 635 p., $4. Adherence to a single classification system regardless of its limitations has made many librarians lose their sense of perspective. This volume, the result of ten years of study, with its discussion of the various existing systems and suggestions for improvement, is stimulating.

Science News Letter, November 18, 1933

Science News Letter will secure for its subscribers any book or magazine in print which was published in the United States. Send check or money order to cover regular retail price ($5 if price is unknown, change to be remitted) and we will pay postage in the U. S. When publications are free, send 10c for handling. Address: Book Dept., Science News Letter, 21st and Constitution Ave., Washington, D. C.